

WHAT IS CLAIMED IS:

1           1. A system for propagating error status over an error checking and correcting  
2 (ECC) protected channel comprising:

3           a first device, the first device receiving data and an error status associated with  
4 the data, the first device generating check bits for the data based on a first ECC code  
5 and combining the check bits with the data to form at least one codeword;

6           a channel operably connected to the first device, the first device sending the at  
7 least one codeword across the channel, the first device inserting a triple error into a  
8 nibble of one at least one codeword sent if the error status indicated an uncorrectable  
9 error; and

10          a second device operably connected to the channel, the second device receiving  
11 the at least one codeword sent across the channel, the second device detecting triple  
12 errors within a nibble of the at least one codeword and any other single error in the at  
13 least one codeword using a second ECC code.

1           2. The system according to claim 1, wherein the other single error comprises an  
2 error introduced by the channel.

1           3. The system according to claim 1, wherein the first device includes a  
2 controller, the controller receiving the error status.

1           4. The system according to claim 1, wherein the first device includes a code  
2 generator, the code generator generating check bits for the data based on the first

3 ECC code and combining the check bits with the data to form the at least one  
4 codeword.

1 5. The system according to claim 4, wherein the check bits are located in the at  
2 least one codeword to allow for single 4 bit nibble error detection (S4ED).

1 6. The system according to claim 1, wherein the second ECC code comprises  
2 the first ECC code with additional columns inserted denoting designated positions of  
3 check bits, the check bit positions providing for single 4 bit nibble error detection  
4 (S4ED).

1 7. The system according to claim 1, wherein a check bit is generated for each  
2 row of the first ECC code, the data comprising at least one data word, each check bit  
3 comprising the dot product of a row of the first ECC code and a data word.

1 8. The system according to claim 1, wherein the first device includes an error  
2 injection circuit, the error injection circuit injecting a triple error into a nibble of the at  
3 least one codeword if the error status indicated an uncorrectable error.

1 9. The system according to claim 1, wherein the second device includes a  
2 syndrome processor, the syndrome processor receiving the at least one codeword and  
3 re-computing the check bits on the data using the second ECC code, the second device

4 generating a syndrome by comparing the check bits in the at least one codeword with  
5 the re-computed check bits.

1 10. The system according to claim 9, wherein the syndrome comprises the dot  
2 product of the second ECC code AND each at least one codeword.

1 11. The system according to claim 9, further comprising an error classifier, the  
2 error classifier classifying errors in the received at least one codeword based on the  
3 syndrome.

1 12. The system according to claim 11, wherein the classification comprises one  
2 of no error, correctable error, and uncorrectable error.

1 13. The system according to claim 1, wherein the error status indicates one of  
2 no error, correctable error, and uncorrectable error.

1 14. The system according to claim 1, wherein the first ECC code comprises a  
2 matrix.

1 15. A method for propagating error status over an error checking and correcting  
2 (ECC) protected channel comprising:  
3 receiving data and an error status associated with the data at a first device;

4           generating check bits for the data based on a first ECC code and combining the  
5           check bits with the data to form at least one codeword at the first device;

6           sending the at least one codeword across a channel, the first device inserting a  
7           triple error into a nibble of at least one codeword sent if the error status indicated an  
8           uncorrectable error; and

9           receiving the at least one codeword sent across the channel by a second device,  
10          the second device detecting any triple errors within a nibble of the at least one  
11          codeword and any other single error in the at least one codeword using a second ECC  
12          code.

1           16. The method according to claim 15, wherein the other single error comprises  
2           an error introduced by the channel.

1           17. The method according to claim 15, further comprising placing the check bits  
2           in the at least one codeword to allow for single 4 bit nibble error detection (S4ED).

1           18. The method according to claim 15, wherein the second ECC code comprises  
2           the first ECC code with additional columns inserted denoting designated positions of  
3           check bits, the check bit positions providing for single 4 bit nibble error detection  
4           (S4ED).

1           19. The method according to claim 15, further comprising generating a check  
2 bit for each row of the first ECC code, the data comprising at least one data word, each  
3 check bit comprising the dot product of a row of the first ECC code and a data word.

1           20. The method according to claim 15, further comprising recomputing the check  
2 bits on the data using the second ECC code by the second device, the second device  
3 generating a syndrome by comparing the check bits in the at least one codeword with  
4 the re-computed check bits.

1           21. The method according to claim 20, wherein the syndrome comprises the dot  
2 product of the second ECC code AND each at least one codeword.

1           22 The method according to claim 20, further comprising using the syndrome  
2 to classify errors in the received at least one codeword.

1           23. The method according to claim 20, further comprising determining a weight  
2 of nibbles of the syndrome where the weight is the number of '1's in the syndrome, the  
3 classification being based on the weight.

1           24. The method according to claim 22, wherein the classification comprises one  
2 of no error, correctable error, and uncorrectable error.

1           25. The method according to claim 15, wherein the error status indicates one  
2 of no error, correctable error, and uncorrectable error.

1           26. An article comprising a storage medium containing instructions stored  
2 therein, the instructions when executed causing a processing device to perform:  
3           receiving data and an error status associated with the data;  
4           generating check bits for the data based on an ECC code and combining the  
5 check bits with the data to form at least one codeword; and  
6           sending the at least one codeword across a channel, the processing device  
7 inserting a triple error into a nibble of the at least one codeword sent if the error status  
8 indicated an uncorrectable error.

1           27. The article according to claim 26, wherein the error status indicates one of  
2 no error, correctable error, and uncorrectable error.

1           28. The article according to claim 26, wherein the ECC code comprises a matrix.

1           29. The article according to claim 26, wherein a check bit is generated for each  
2 row of the ECC code, the data comprising at least one data word, each check bit  
3 comprising the dot product of a row of the ECC code and a data word.